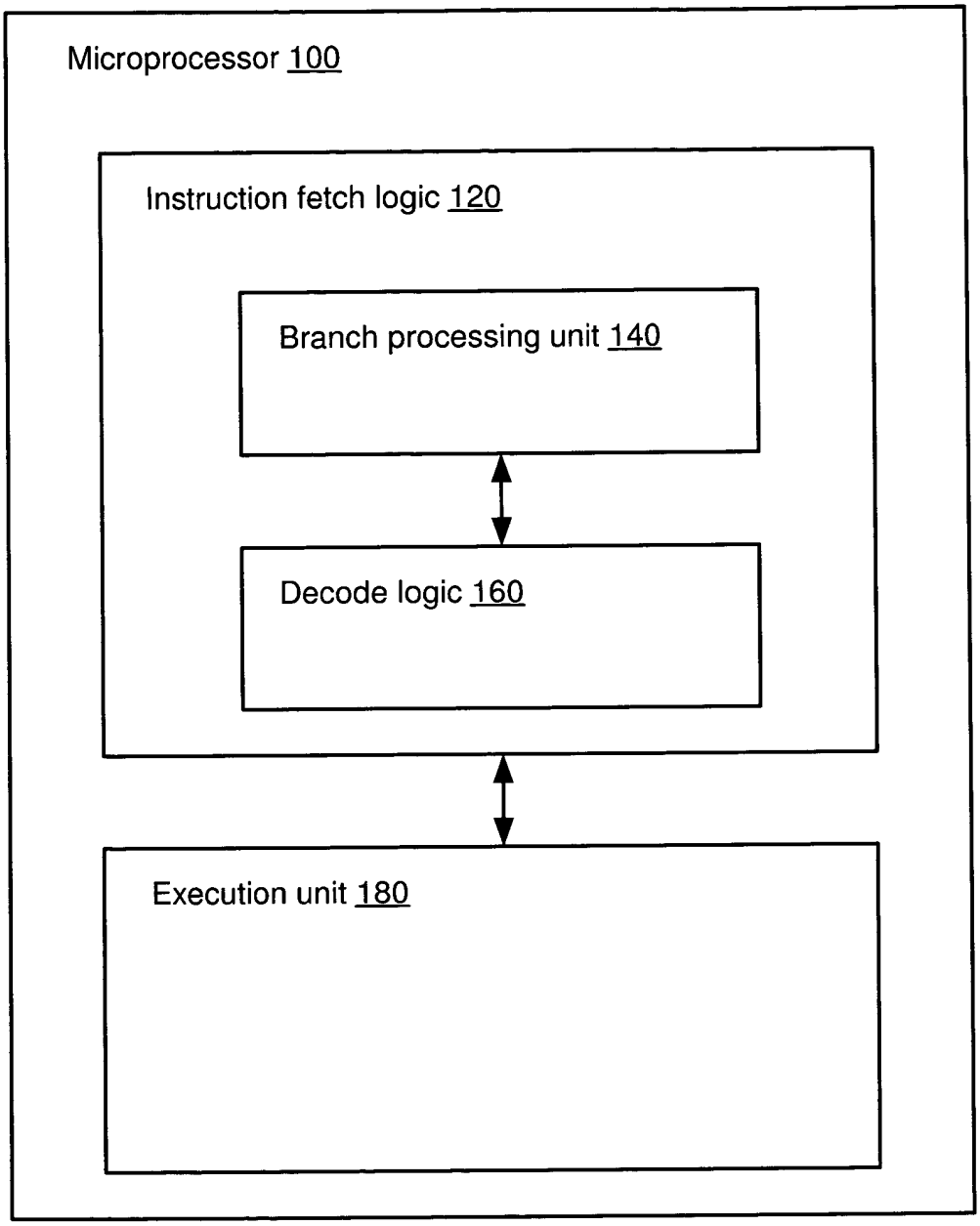
Microprocessor 100
Instruction fetch logic 120
Branch processing unit 140
Decode logic 160
Execution unit 180

FIG. 1

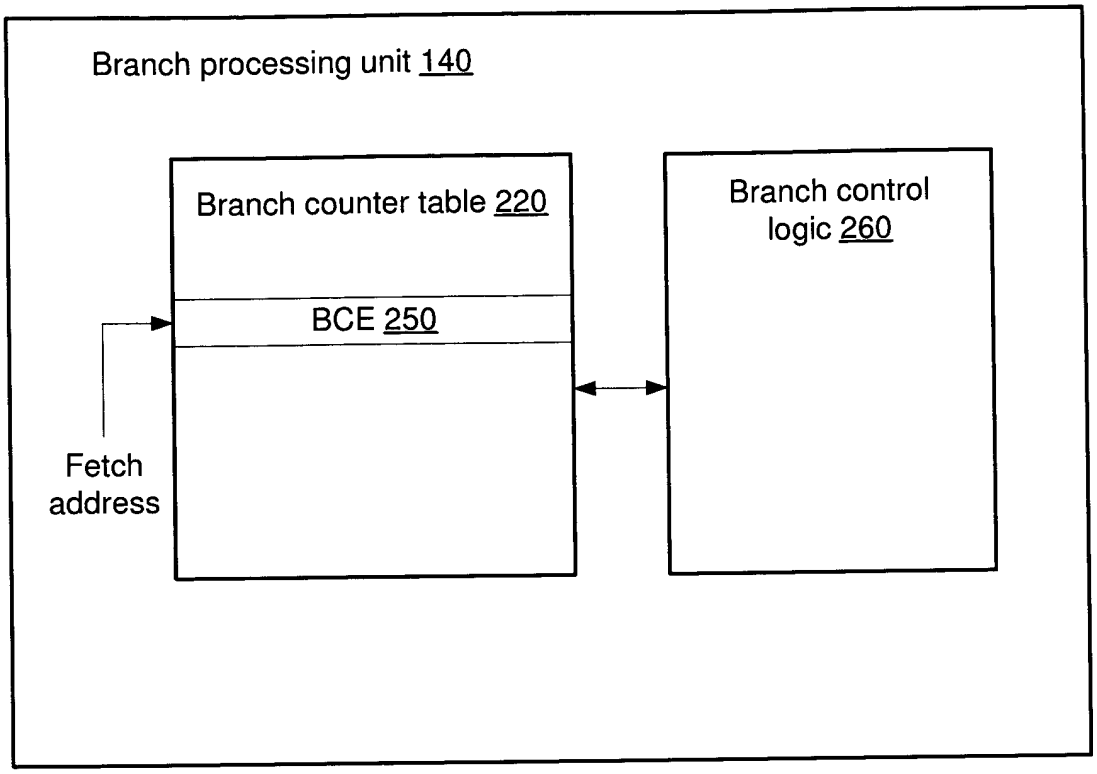
Branch processing unit 140
Branch counter table 220
BCE 250
Branch control logic 260
Fetch address

FIG. 2

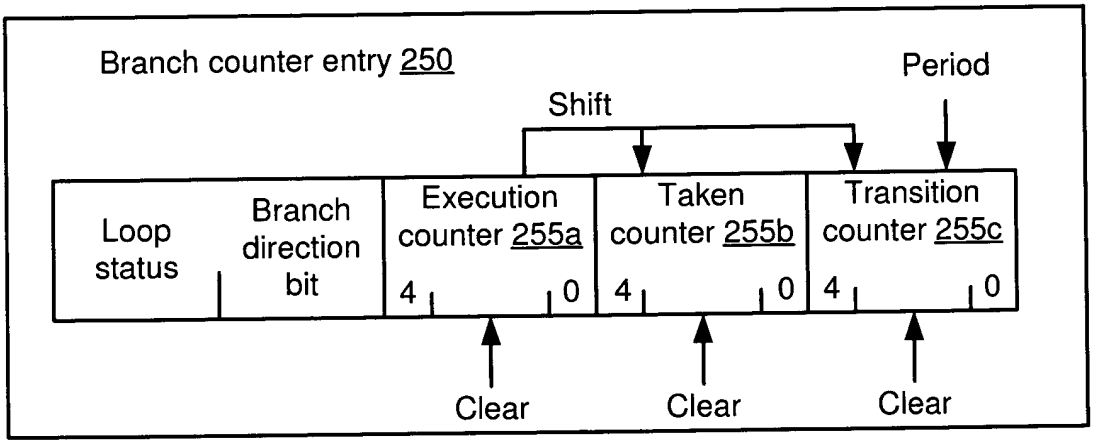
Branch counter entry 250
Period
Shift
Loop status
Branch direction bit
Execution counter 255a
Taken counter 255b
Transition counter 255c
4
0
4
0
4
0
Clear
Clear
Clear

FIG. 3

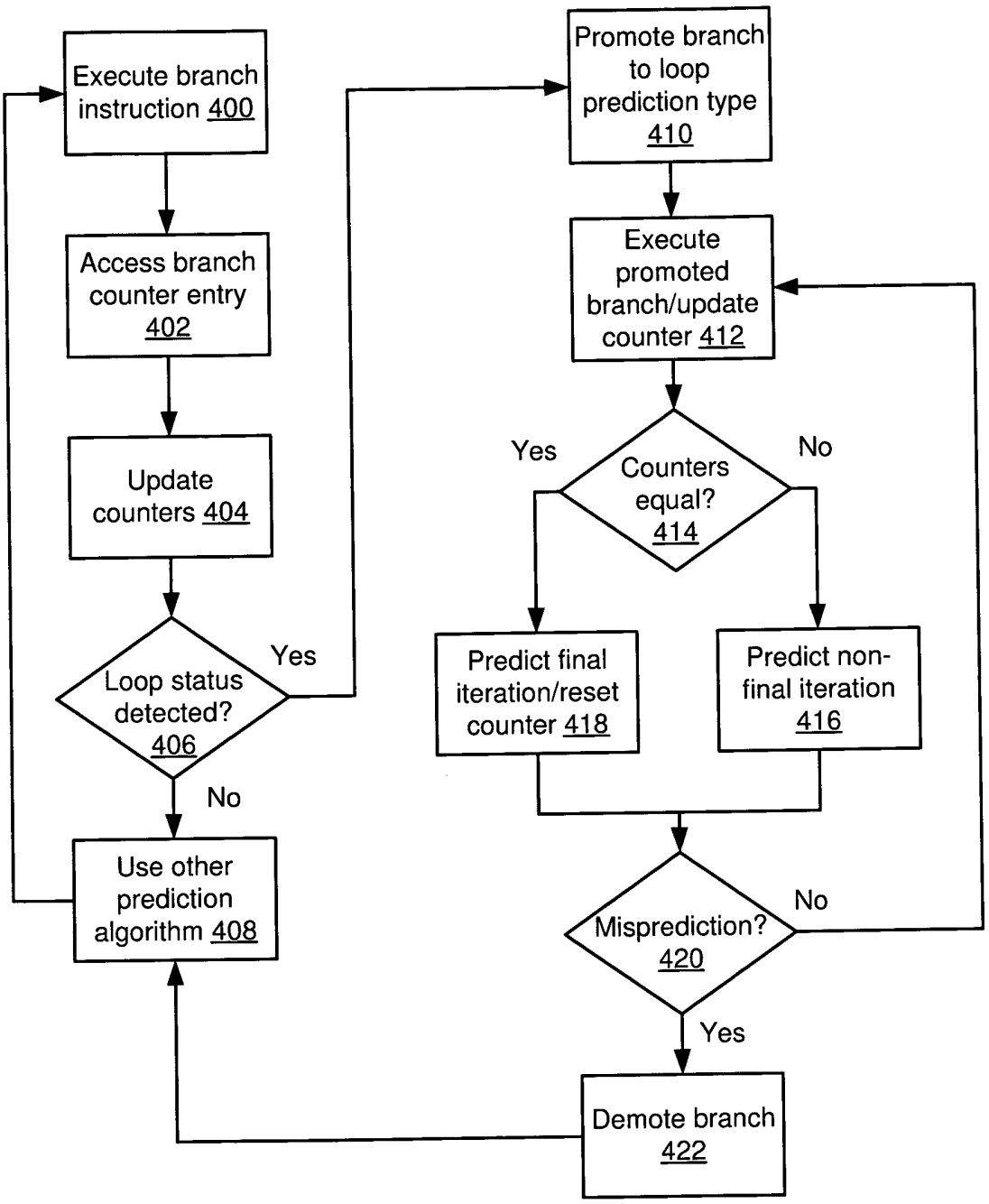
Execute branch instruction 400
Access branch counter entry 402
Update counters 404
Loop status detected? 406
Yes
No
Use other prediction algorithm 408
Promote branch to loop prediction type 410
Execute promoted branch/update counter 412
Counters equal? 414
Yes
No
Predict final iteration/reset counter 418
Predict non-final iteration 416
Misprediction? 420
No
Yes
Demote branch 422

FIG. 4

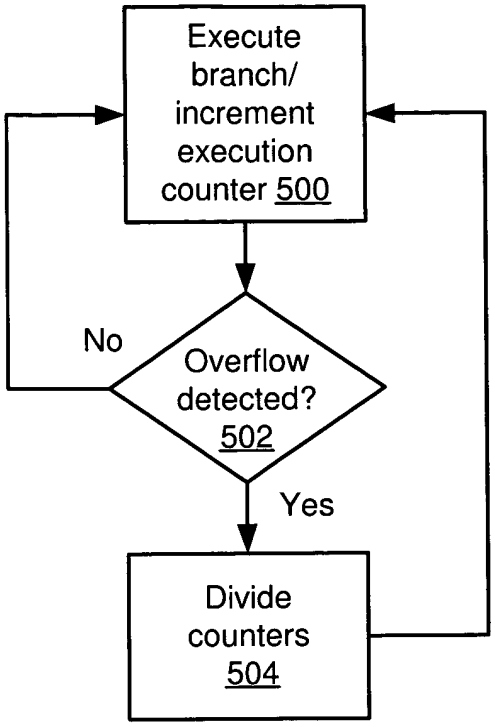
Execute branch/ increment execution counter 500
No
Overflow detected? 502
Yes
Divide counters 504

FIG. 5